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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matters of	
DEPLOYMENT OF WIRELINE SERVICES OFFERING ADVANCED TELECOMMUNICATIONS CAPABILITY	CC Docket No. 98-147
and	
IMPLEMENTATION OF THE LOCAL COMPETITION PROVISIONS OF THE TELECOMMUNICATIONS ACT OF 1996	CC Docket No. 96-98

COMMENTS OF CISCO SYSTEMS, INC.

Cisco Systems, Inc. hereby responds to the request for comment in the above referenced rulemaking proceedings,[1] focusing upon a single issue: the definition of "necessary" under Section 251(c)(6) of the Telecommunications Act of 1996. Cisco encourages the Commission to use a contextual approach, combined with an appropriate limiting standard, to define term "necessary" in a manner that will assure a level playing field for all competitors. Specifically, equipment should be deemed "necessary" under Section 251(c)(6) when its function or functions effectuate interconnection or access to unbundled network elements ("UNEs") and ***could not be performed offsite as a practical, economic, or operational matter.***

Cisco Systems is a worldwide leader in the manufacture of networking equipment. Cisco customers include providers of advanced services over wireline,

[1] *See Deployment of Wireline Services Offering Advanced Telecommunications Capability*, FCC 00-297 (rel. August 10, 2000) ("*FNPRM*").

wireless, cable and other networks around the world. Right now these service providers are seizing upon unprecedented opportunities created by telecommunications deregulation and newly competitive markets, racing to deploy smarter, faster and more efficient networks that can deliver increasingly advanced services to consumers. To meet service providers' needs in this environment, Cisco has consistently strived to make products that can perform more functions, more efficiently, at lower cost, and at higher speed. The Commission need not, and surely should not, adopt a stilted interpretation of the statute that would stifle such innovation and place competitive LECs at a distinct – and perhaps insurmountable – economic disadvantage.

BACKGROUND

Section 251(c)(6) requires incumbent local exchange carriers ("LECs") to permit physical collocation of equipment "necessary for interconnection or access to unbundled network elements."[2] This obligation is a necessary prerequisite to competitive entry, especially for those carriers seeking to provide service using UNE-based platforms. In its first application of this provision, the Commission interpreted it as requiring incumbent LECs to permit competitors to collocate equipment that is "used" or "useful" for either interconnection or access to UNEs.[3] As applied to the provision of advanced services, the Commission held that any equipment that is "used or useful" for either interconnection or access to UNEs, regardless of whether such equipment includes

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[2] 47 U.S.C. § 251(c)(6).

[3] *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd. 15499, 15794-95 (1996) ("*Local Competition First R&O*").

enhanced services capabilities or offers other functionalities, is eligible for collocation.[4] The Commission also concluded that an incumbent LEC could not limit a competitor's ability to use all of the features, functions, and capabilities of collocated equipment.[5]

However, in *GTE v. FCC*, the D.C. Circuit held that the Commission's interpretation of "necessary" under this section of the act was overbroad as applied to advanced services. It remanded the *Advanced Services First R&O* to the extent it required that an incumbent LEC permit physical collocation of equipment that is not "directly related to and thus necessary, required, or indispensable to 'interconnection or access to unbundled network elements.'"[6] Accordingly, the Court invited the Commission to refine its collocation requirements on remand by adopting a formulation that falls within the limits of the "ordinary and fair meaning" of Section 251(c)(6).[7]

In *GTE v.* FCC, the Court explained that "a statutory reference to 'necessary' must be construed in a fashion that is consistent with the ordinary and fair meaning of the word, *i.e.,* so as to limit 'necessary' to that which is required to achieve a desired goal."[8] This conclusion echoed a prior Supreme Court holding that, in defining what proprietary network elements are "necessary" within the meaning of Section 251(d)(2)(A) of the Communications Act, the Commission "must apply *some* limiting standard, rationally

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4 *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, 14 FCC Rcd. 4761, 4776 (1999) ("*Advanced Services First R&O*"), *aff'd in part and remanded in part sub nom. GTE Service Corp. v. FCC*, 205 F.3d 416 (D.C. Cir. 2000) ("*GTE v. FCC*").

5 *Id.*

6 *GTE v. FCC*, 205 F.3d at 422.

7 *Id.*

8 *GTE v. FCC*, 205 F.3d at 422.

related to the goals of the Act."[9] Accordingly, the Commission's task in this proceeding is to develop an appropriate limiting standard that can be used to determine which equipment is entitled to collocation.

DISCUSSION

A key component of the Telecommunications Act of 1996, Section 251(c)(6) was part of a pro-competitive national policy framework "designed to accelerate rapidly private sector deployment of advanced telecommunications and information technologies and services to all Americans by opening all telecommunications markets to competition."[10] Section 251(c)(6) in particular enables competitive entry strategies that rely upon the use of UNE-based platforms (as opposed to pure resale or recreating the facilities of an incumbent LEC) to provide service. The Commission should, of course, construe statutory terms in a manner that promotes this objective and does not foreclose UNE-based entry.

A number of the incumbent LECs have embarked upon ambitious programs to deploy advanced services within their regions and around the nation. For example, SBC has launched Project Pronto, an aggressive $6 billion initiative designed to "[r]earchitect its network to push fiber deeper into the neighborhoods it serves and accelerate the convergence of its voice and data backbone systems into a next-generation, packet-switched, designed-for-the-Internet network."[11] Other incumbent LECs are similarly launching exciting roll-outs of advanced services to bring greater broadband capabilities

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9 *AT&T Corp. v. Iowa Utilities Board*, 525 U.S. 366, 388 (1999).

10 *See* H.R. CONF. REP. NO. 458, 104th Cong., 2d Sess. 1 (1996).

11 *See* description at www.sbc.com/data/network/pronto.html.

to more Americans, roll-outs that are heavily dependent upon the deployment of new and advanced equipment. Cisco applauds such efforts to extend the reach and enhance the quality of Internet services for American consumers. However, as the incumbents introduce innovative service offerings, competitive LECs must be allowed to respond by upgrading their own capabilities and offering new or additional services through which to differentiate themselves from the incumbents.

Physical collocation is the key to allowing competitive LECs to enter the market without replicating the incumbent LEC's local loop infrastructure – a clear goal of the 1996 Act. And as service providers race to deploy equipment capable of meeting the public's desire for broadband services, the market reality of what is "necessary" changes as well. Any regulatory system that does not take such changes into account is destined to stifle innovation and severely hamper entry by new competitors by consigning them to an antiquated level of technology. This is surely not what Congress intended in drafting Section 251(c)(6).

The Commission recently faced a closely analogous situation arising under a different part of Section 251. That proceeding involved the definition of whether a proprietary network element is "necessary" within the meaning of the unbundling requirements of Section 251(d)(2)(A). The Commission had originally defined "necessary" to mean that "an element is a prerequisite for competition,"[12] but the Supreme Court vacated and remanded the matter for further consideration because the Commission had not adequately taken into consideration the availability of elements outside the incumbent's network and had assumed that *any* increase in cost (or decrease

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[12] *Local Competition First R&O*, 11 FCC Rcd. at 15641-42.

in quality) imposed by a denial of access rendered such access necessary.[13] In the *UNE Remand Order*, the Commission held that a proprietary network element is necessary if,

> taking into consideration the availability of alternative elements outside the incumbent's network, including self-provisioning by a requesting carrier or acquiring an alternative from a third-party supplier, lack of access to that element would, as a practical, economic, and operational matter, *preclude* a requesting carrier from providing the services it seeks to offer.[14]

Thus, the Commission has recognized that the concept of "necessary" is a contextual one that depends upon the practical, economic, and operational aspects of a given situation.

The Commission can and should use a similar approach in defining the term "necessary" in this proceeding. Doing so will put in place a collocation regime that is definite enough to establish an appropriate limiting principle but flexible enough to accommodate the inevitable technological advances in the future.

I. The Standard

Even before being granted specific statutory authority to mandate collocation, the Commission had considered the kinds of equipment a competing carrier should be able to collocate in order to provide basic telecommunications services. In those proceedings, the Commission concluded that equipment needed to terminate basic transmission facilities – such as multiplexers and optical terminating equipment – must be collocated to interconnect with the incumbent's network.[15] Cisco believes that this pre-1996 Act

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13 *AT&T Corp.*, 525 U.S. at 388-90.

14 *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, 15 FCC Rcd. 3696, 3721 (1999)(emphasis in original)("*UNE Remand Order*").

15 *See, e.g., Expanded Interconnection with Local Telephone Company Facilities*, 7 FCC Rcd. 7369, 7413-14 (1992); *Expanded Interconnection with Facilities of Local Telephone Company Facilities*, 8 FCC Rcd. 7374, 7412-13 (1993); *Expanded Interconnection with Local Telephone Company Facilities*, 9 FCC Rcd. 5154, 5180-81 (1994). The physical collocation rules adopted in these orders were vacated as a "taking" of incumbent LEC property that was not expressly

precedent offers a useful baseline with respect to equipment necessary for interconnection.

But this precedent is only a starting point for the analysis under Section 251(c)(6). First, the Commission's conclusions were reached well before the widespread introduction of advanced services and thus focused only on interconnection for circuit-switched technologies (specifically, special access and switched transport). The increasing prominence of packet-switched services necessitates a broadening of the analysis. Second, because UNEs are a concept introduced in the 1996 Act, the Commission's conclusion does not address whether additional functionalities might be needed to access particular UNEs. For example, dark fiber is now a UNE and a competitive LEC must be allowed to collocate equipment necessary to "light" such fiber in order to provide service.

In addition, as networks, services, and technologies converge, equipment must be designed to handle ever more complex tasks. Fortunately, advances in computer processors and miniaturization have allowed manufacturers to design and build increasingly intelligent boxes that perform more functions but take up no more space and consume less power than did their less advanced predecessors. Manufacturers and service providers have favored multifunctional equipment precisely because it offers capabilities that are most efficiently and effectively performed as an integrated set of functions. Cisco believes that, under the test laid out above, most if not all of the functionalities being built into multifunctional equipment available today is "necessary"

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authorized by statute. *See Bell Atlantic Tel. Co. v. FCC*, 24 F.3d 1441 (D.C. Cir. 1994); and *Pacific Bell v. FCC*, 81 F.3d 1147 (D.C. Cir. 1996).

for interconnection or access to UNEs to provide the kinds of services customers demand in the marketplace.

II. Application of the Standard

Applying this standard to a piece of equipment that has typically been collocated under the Commission's rules will help illustrate the principles underlying this approach. Clearly, any type of equipment entitled to collocation under the Commission's pre-1996 Act *Expanded Interconnection* requirements (such as pure multiplexing equipment and pure terminating equipment) would fall within the bounds of items entitled to collocation under Section 251(c)(6) as well. For purposes of this discussion, we will examine the features of a piece of equipment that may not fall neatly into that category -- a digital subscriber line access multiplexer ("DSLAM") – to illustrate the analysis.[16]

As the Commission has recognized, a DSLAM's primary function is multiplexing.[17] However, a typical DSLAM performs many other functions as well. "The DSLAM combines: (1) the ability to terminate copper customer loops (which includes both a low-band voice channel and a high-band data channel); (2) the ability to forward the voice channels, if present, to a circuit switch or multiple circuit switches; (3) the ability to extract data units from the data channels on the loops; and (4) the ability to combine data units from multiple loops onto one or more trunks that connect to a packet switch or packet switches."[18] Moreover, the latest generation of DSLAM being built by

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[16] It is worth noting that the Commission did not include certain network elements used for the provision of advanced services on its list of UNEs precisely because competitive LECs were able to collocate equipment such as DSLAMs in incumbent LEC premises. *See UNE Remand Order*, 15 FCC Rcd. at 3835-39.

[17] *Ameritech Corp. and SBC Communications, Inc.*, FCC 00-336 at ¶ 15 (rel. Sept. 8, 2000) (recognizing DSLAMs' "primary multiplexing functionality").

[18] *UNE Remand Order*, 15 FCC Rcd. at 3833-34.

Cisco includes "smart" technology that enables the equipment to ensure performance quality of service ("QoS") for new and emerging broadband applications that necessitate very low delay, very low delay variance, and/or very low loss of data. For example, such QoS functionalities can allocate bandwidth and thereby prioritize real-time applications (such as voice services) and enable carriers to offer customers service level agreements that guarantee specific bandwidth levels.

The Commission has previously established that the DSLAM's primary function – multiplexing – is entitled to collocation, as is its ability to terminate customer loops. And in the context of modern technology, it should conclude that the QoS functions are equally crucial to a competitive LEC's ability to interconnect and access UNEs. Data services are maturing from a first-generation approach, in which providing undifferentiated bulk capacity was the goal, to a second-generation approach in which operators are better able to compete by differentiating their service offerings. For example, businesses are making increasing use of bandwidth-intensive and real-time applications (such as videoconferencing and voice over IP). In order to meet this demand, a service provider must be able to guarantee a certain level of performance (or QoS) commensurate with these services for those needing certainty and reliability. QoS functionalities enable a DSLAM to prioritize traffic to allow a carrier to offer, for example, toll-quality voice services and traditional data services over a single DSL "pipe."

The example attached hereto illustrates two ways that a competitive LEC could meet these QoS requirements. The example assumes a typical service mix in which a DSLAM with 256 ports is allocated 20% to business or small office access requiring a

relatively high amount of bandwidth (768 kbps), 60% to telecommuter or small office/home office users requiring a middle range of bandwidth (256 kbps), and 20% for residential customers at dial-up Internet speeds (56 kbps). The aggregate bandwidth accounted for by these users is 81,510 kbps, which is nearly twice the 45,000 kbps of bandwidth available on a standard DS-3 transport.

The first scenario assumes collocation of a "smart" DSLAM with built-in QoS functions. Because demand for transport bandwidth varies over time, it is most efficient and cost-effective for service providers to sell more bandwidth than is actually available if every customer sought its full allocation at the same time. Such oversubscription is possible if the network includes intelligence to assign QoS priority to those customers with guaranteed commitments for their high-bandwidth and real-time applications. As illustrated in the example, a single "smart" DSLAM with a single uplink and a single DS-3 backhaul facility for transport can meet the competitive LEC's service requirements for 256 customers at a cost of $102,200.

The second scenario assumes collocation of a DSLAM that serves only as a multiplexer and provides no QoS functionalities. In that case, the only way to ensure that bandwidth demands can be met is to buy sufficient bandwidth to meet the maximum demand at all times. As illustrated in the example, doing so requires the purchase of additional DSLAM ports (although at a lower per-port cost than for a "smart" DSLAM), additional installation, a second uplink, additional power, and an additional DS-3 transport, for a total cost of $134,100 to serve the same 256 customers.

Thus, ***the inability to collocate QoS functionalities raises the competitive LEC's costs by 31%.***[19] Given the highly competitive nature of the local services market, such a cost differential could easily make a competitive LEC non-viable as a practical, economic, and operational matter. Moreover, the non-QoS scenario actually places greater collocation burdens upon the incumbent LEC as well, since it requires additional power, more DS-3 lines, and additional space to house the extra DSLAM ports. In other words, failing to recognize the extent to which advanced functionalities are "necessary" for interconnection or access to UNEs would result in a proliferation of space, power, heat dissipation and other requirements that impact incumbent LEC central office facilities as well as the competitive LEC's ability to offer service. Thus, an inflexible rule that unnecessarily limited the functionalities that qualify for collocation would have the unintended and undesirable consequence of placing additional burdens on incumbent LEC resources – just the opposite of what the D.C. Circuit sought in remanding the case to the Commission.[20] The standard proposed herein is more consistent with the stated and understandable desire of incumbent LECs for a limiting principle that will circumscribe the extent to which their facilities are available to competitors. But it will also achieve the goal of the 1996 Act of facilitating competitive entry.

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[19] The second scenario actually doubles the recurring costs paid by a competitive LEC year after year.

[20] *See GTE v. FCC*, 205 F.3d at 422 (finding merit in the incumbent LEC's argument that the Commission's collocation rules "impermissibly invite[] unwarranted intrusion upon LECs' property rights").

This is but one illustration of the standard Cisco believes the Commission should adopt. However, it demonstrates the kind of analysis required to determine whether particular equipment and functionalities are "necessary" in an ever-changing technological environment. It also demonstrates the nexus required for collocation of multifunctional equipment that can serve as the limiting principle sought by the courts. Thus, reliance upon practical, economic, and operational factors to determine the necessity of collocation is both good policy and good law.

CONCLUSION

The 1996 Act and the Commission's efforts have helped speed the deployment of equipment to provide advanced services throughout the United States. However, further progress could be stymied by a construction of the statute that undermines its pro-competitive objectives. Cisco believes that a reasonable construction of the term "necessary" as used in Section 251(c)(6) will continue to allow competitive LECs to collocate equipment that performs functions that are not susceptible to provision from a remote site as a practical, economic, or operational matter. Such a construction of the statute will provide an appropriate limitation on the kinds of equipment that may be collocated in an incumbent LEC central office without stifling the spread of innovative advanced service offerings.

Respectfully submitted,

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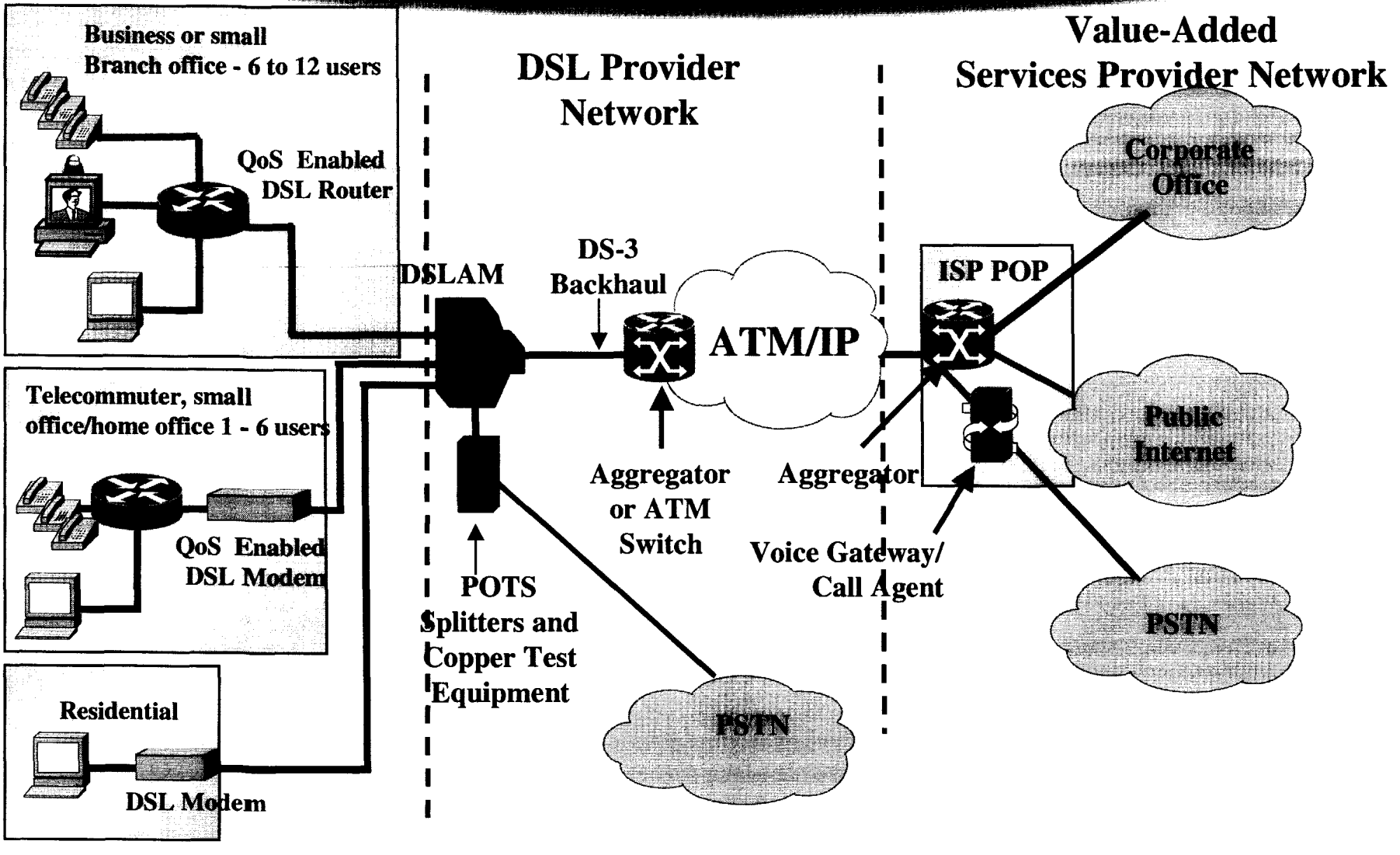

Typical DSLAM Service Mix	Bandwidth (kbps)	No. Ports	Aggregate Demand Kbps
256 Ports Per DSLAM			
20% of Ports are Business or Small Office Access	768	51	39,322
60% of Ports are Telecommuter / SOHO	256	154	39,322
20% of Ports are Residential	56	51	2,867
Total		256	81,510
DS-3 Transport Bandwidth			45,000
Oversubsribed Bandwidth			**36,510**

- Service providers oversubscribe transport bandwidth to reduce equipment and facility transport costs
- Oversbuscription leads to bandwith congestion during peak demand periods, yet application quality and customer service agreements must still be maintained
- QoS capabilities in a "Smart" DSLAM provide this assurance
- The absence of a Smart DSLAM requires expensive additional investments in network plant

SMART DSLAM Service Mix	Bandwidth (kbps)	No. Ports	Aggregate Demand Kbps
256 Ports Per DSLAM			
20% of Ports are Business or Small Office Access	768	51	39,322
60% of Ports are Telecommuter / SOHO	256	154	39,322
20% of Ports are Residential	56	51	2,867
Total		256	81,510
DS-3 Transport Bandwidth			45,000
Oversubsribed Bandwidth			**36,510**

COST SUMMARY USING SMART QoS ENABLED DSLAM	
Fixed Costs	
DSLAM (256 ports x $250 per port)	$64,000
DSLAM Installation	$13,900
ATM DS3 Switch Port (uplink)	$2,100
Recurring Costs	
Power - $15 per AMP x 30 AMPs	$450
DS-3 Backhaul Facility	$1,400
TOTAL Annual Cost	**$102,200**

Multiplexor DSLAM Service Mix	Bandwidth (kbps)	No. Ports	Aggregate Demand Kbps
256 Ports Per DSLAM			
20% of Ports are Business or Small Office Access	768	26	19,968
60% of Ports are Telecommuter / SOHO	256	85	21,760
20% of Ports are Residential	56	51	2,867
Total			44,595
DS-3 Transport Bandwidth			45,000
Oversubsribed Bandwidth		162	0.0
Additional Bandwidth Required			36,915

Number of ports reduced by approximately half due to insufficient transport capacity . . .

. . . Requiring an additional DS-3 facility to compensate . . .

COST SUMMARY USING MULTIPLEXOR	
Fixed Costs	
DSLAM (256 ports x $190 per port)	$48,640
DSLAM Installation	$13,900
ATM Switch Port (uplink)	$2,100
Recurring Costs	
Power - $15 per AMP x 30 AMPs	$450
DS-3 Backhaul Facility	$1,400
Annual Cost	$86,840
Additional Multiplexor Costs	
Additional DSLAM Ports	
94 ports @ $190/port	$17,860
Installation	$5,100
Additional 2nd ATM Switch Port	$2,100
Additional Recurring Costs	
Additional Power - $15 per AMP x 30 AMPs	$450
Additional 2nd DS-3 Facility	$1,400
Total Annual Additional Cost	$47,260
Total Annual Cost	$134,100

. . . Resulting in additional hardware and install costs . . .

. . . And in additional transport and power costs

- **Muliplexer scenario increases CLEC costs by 31% versus "Smart" QoS DSLAM ($134,100 vs $102,200)**
- **Multiplexer scenario proliferates equipment and therefore central office space, power, and other requirements thereby increasing CLEC and ILEC costs further**